

CLAIMS

1. Terrain anticollision equipment (1) carried
onboard an aircraft (A), comprising means for
5 determining at least one virtual envelope of protection
of maneuver (W, C) constructed around the short term
predicted trajectory of the aircraft and delimiting a
protection volume around the current position and the
current trajectory of the aircraft, means for detecting
10 intrusions, into said virtual envelope or envelopes of
protection of maneuver (W, C), of a representation of
an envelope (MTCD) of the terrain and/or of the ground
obstacles overflown stored in a data base onboard (3)
or on the ground, and alarm means (5) triggered by the
15 intrusion detection means,
characterized in that, after detection of a risk of
ground collision, its means of determining virtual
envelopes of protection determine, in addition to the
virtual envelope or envelopes of protection of maneuver
20 (W, C), at least one virtual envelope of protection of
resumption of route (L), constructed around a
fictitious trajectory of resumption of route,
in that its means of intrusion detection detect the
intrusions of the terrain and/or of the ground
25 obstacles (R) at one and the same time into the virtual
envelope or envelopes of protection of maneuver (W, C)
and into the virtual envelope or envelopes of
protection of resumption of route (L) and
in that its alarm means produce an indication signaling
30 the possibility of ending an avoidance maneuver as soon
as the means of intrusion detection no longer note any
intrusion of the terrain and/or of the ground obstacles
(R) into the virtual envelope or envelopes of
protection of resumption of route (L).
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2. The equipment as claimed in claim 1, characterized
in that the fictitious trajectory of resumption of
route is a horizontal trajectory.

3. The equipment as claimed in claim 1, characterized in that the fictitious trajectory of resumption of route is a trajectory having as slope a horizontal slope if the instantaneous trajectory of the aircraft is climbing or holding level, and a slope dependent on the instantaneous trajectory of the aircraft if the aircraft is descending.
4. The equipment as claimed in claim 1, characterized in that the fictitious trajectory of resumption of route is a trajectory having as slope a slope dependent on the instantaneous trajectory of the aircraft.
5. The equipment as claimed in claim 1, characterized in that the fictitious trajectory of resumption of route is a trajectory having as slope a slope dependent on the trajectory of the aircraft at the moment of the detection of the risk of terrain collision.
6. The equipment as claimed in claim 1, characterized in that the fictitious trajectory of resumption of route is a trajectory having as slope a slope dependent on the trajectory of the aircraft at the moment of the detection of the risk of terrain collision, if the latter was descending, and a horizontal trajectory if the latter was flying horizontally or climbing at the moment of the detection of the risk of terrain collision.
7. The equipment as claimed in one of the preceding claims, characterized in that the fictitious trajectory of resumption of route is a trajectory having as heading the instantaneous heading of the aircraft (A).
8. The equipment as claimed in one of claims 1 to 6, characterized in that the fictitious trajectory of resumption of route is a trajectory having as heading and slope those of the trajectory of the aircraft (A) at the moment of the detection of the risk of terrain

collision.

9. The equipment as claimed in claim 1, characterized
in that the limits of the virtual envelope or envelopes
5 of protection are defined by a so-called feeler surface
(W, C, L) the meeting of which with the representation
of an envelope of the terrain and/or of the ground
obstacles (R) which is extracted from the information
of the data base (3) is regarded as an intrusion of the
10 terrain and/or of the ground obstacles (R) into the
corresponding virtual envelope of protection.

10. The equipment as claimed in claim 9, characterized
in that, regardless of the instantaneous attitude of
15 the aircraft (A): (climbing, flying level or
descending), the projection onto the horizontal of a
feeler (W or C) of virtual envelope of protection of
maneuver is adopted as feeler (L) of a virtual envelope
of protection of resumption of route.

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11. The equipment as claimed in claim 9, characterized
in that, when the instantaneous attitude of the
aircraft (A) is climbing or flying level, the
projection onto the horizontal of a feeler (W or C) of
25 virtual envelope of protection of maneuver is adopted
as feeler (L) of a virtual envelope of protection of
resumption of route.

12. The equipment as claimed in claim 9, characterized
30 in that, when the instantaneous attitude of the
aircraft (A) is descending, the projection according to
an inclined plane dependent on the instantaneous
descent slope of the aircraft of a feeler (W or C) of
virtual envelope of protection of maneuver is adopted
35 as feeler (L) of a virtual envelope of protection of
resumption of route.

13. The equipment as claimed in claim 1, characterized
in that, when the instantaneous attitude of the

aircraft (A) is descending, the projection along an inclined plane dependent on the instantaneous descent slope of the aircraft of a feeler (W or C) of virtual envelope of protection of maneuver during a certain
5 distance or flight time and then according to the horizontal is adopted as feeler (L) of a virtual envelope of protection of resumption of route.

14. The equipment as claimed in claim 13,
10 characterized in that, when the terrain anticollision equipment is provided with a display screen showing a representation of the terrain layers and/or of risk with the terrain and/or the obstacles overflown, the projection, in two planes, which is adopted as feeler
15 (L) of a virtual envelope of protection of resumption of route is carried out in a manner consistent with that used on the screen for the representation of the terrain layers and/or of risk with the terrain and/or the obstacles overflown.

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15. The equipment as claimed in claim 1, characterized in that, when the aircraft (A) was climbing or holding level at the moment of the detection of a risk of terrain collision, the projection onto the horizontal
25 of a feeler (W, C) of virtual envelope of protection of maneuver is adopted as feeler (L) of a virtual envelope of protection of resumption of route.

16. The equipment as claimed in claim 1, characterized
30 in that, when the aircraft (A) was descending at the moment of the detection of a risk of terrain collision, the projection, along an inclined plane having the descent slope of the aircraft (A) at the moment of the detection of the risk of terrain collision, of a feeler
35 (W, C) of virtual envelope of protection of maneuver is adopted as feeler (L) of a virtual envelope of protection of resumption of route.

17. The equipment as claimed in claim 1, characterized

in that, when the means of determination of virtual envelope of protection produce two virtual envelopes of protection of maneuver, the more distant (C) for a prealarm of terrain collision and the closer (W) for an alarm of terrain collision, the union of the projections onto the horizontal of the feelers (W, C) of the two virtual envelopes of protection of maneuver is adopted as feeler (L) of a virtual envelope of protection of resumption of route.

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18. The equipment as claimed in claim 1, characterized in that, when the means of determination of virtual envelope of projection produce two virtual envelopes of protection of maneuver, the more distant (C) for a prealarm of terrain collision and the closer (W) for an alarm of terrain collision, the union of the projections, along an inclined plane having the descent slope of the aircraft (A) at the moment of the detection of the risk of terrain collision, of the feelers (W, C) of the two virtual envelopes of protection of maneuver is adopted as feeler (L) of a virtual envelope of protection of resumption of route.

19. The equipment as claimed in claim 1, characterized in that the indication signaling the possibility of ending an avoidance maneuver is given momentarily in aural and/or visual form.

20. The equipment as claimed in claim 1, characterized in that it produces an indication of holding of the avoidance maneuver in aural and/or visual form, upon the disappearance of a terrain alert and does so, until no risk of collision is detected by the virtual envelope of protection of resumption of route (L).

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21. The equipment as claimed in claim 1, characterized in that the vertical distance under the aircraft at which a virtual envelope of protection of resumption of route is placed is taken equal to that used for one of

the virtual envelopes of protection of maneuver.

22. The equipment as claimed in one at least of the preceding claims, characterized in that, when the
5 terrain anticollision equipment is provided with a display screen showing a representation of the terrain layers and/or of risk with the terrain and/or the obstacles overflown, the vertical distance under the aircraft at which a virtual envelope of protection of
10 resumption of route is placed is taken consistent with that used on the screen for the representation of the terrain layers and/or of risk with the terrain and/or the obstacles overflown.